

Patent Application Serial No. 09/599,269
Rose

Page 4 of 13

Remarks

The Office Action and cited references have been reviewed with care in preparation for this amendment and response. As earlier noted, applicant's claims set forth an important advance in the field of annular pleated filter cartridges for liquid filtration. Applicant's claims, including as now amended, patentably distinguish applicant's invention over the prior art.

Applicant thanks the Examiner for the further review and for having lifted the earlier rejections. Applicant believes that the new rejections, although based on newly-cited prior art, are not appropriate; applicant submits, and will show, how the present invention is readily distinguishable over such newly-cited art -- based on information previously submitted to the Examiner. In part, the rejection appears to be based on a possible misconception concerning the filtration materials referred to in the newly-cited prior art. These matters will be discussed in detail below.

Turning now to paragraph 3 of the Examiner's action, various claims were rejected under 35 USC 112, second paragraph, on grounds that the claim terminology "less than about __ mm" is allegedly indefinite. The Examiner refers to MPEP section 2173.05(b) and to *Amgen, Inc. v. Chugai Pharmaceutical Co.*, 18 USPQ2d 1016 (Fed. Cir. 1991), and in doing so raises questions about the meanings of such terms. Specifically, the Examiner asks what values are included.

In response, applicant notes that both the *Amgen* decision and the decision in *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 USPQ 303 (Fed. Cir. 1983), which is cited with approval in the *Amgen* decision, make it clear that the term "about" can be acceptable. The MPEP section noted by the Examiner mentions the *W.L. Gore* decision in referring to such acceptability if

Patent Application Serial No. 09/599,269
Rose

Page 5 of 13

"infringement can clearly be assessed." The *Amgen* decision makes it clear, at page 1031, that its holding of invalidity is *not* based on the term "about" ["it is clear that claims 4 and 5 would also be invalid without the 'about' limitation"] and that the Federal Circuit decision "should not be understood as ruling out any and all uses of this term in patent claims."

In the present situation, the claimed ranges are well separated from prior art ranges for thickness of non-woven filter media used in annular pleated filter cartridges, and applicant is entitled to claim the ranges which are claimed. Acceptable upper limits are given, but thinner non-woven filter media meeting all of the other requirements of the claims, related to the nature and performance of the particular TYVEK filter media, are clearly within the scope of the invention. On the question of acceptable claim terminology, applicant wishes to point out that claim 1 of commonly-owned Patent No. 6,355,171, which relates to a sock filter using such material, was granted with similar claim language approved.

Regarding the basis weight limitation "less than about 45g/m²" in claim 7, the Examiner raises the same point, asking what values are considered or being claimed in the limitation. Yes, there are basis weight values below 45g/m² within the claim. Furthermore, such terminology was approved with respect to claim 6 of the above-noted '171 patent. There is no reason for concern about how low that range might go, since it is clear that a product meeting the other requirements of the claim but having a filter medium with very low basis weight would be within the scope of the invention.

Patent Application Serial No. 09/599,269
Rose

Page 6 of 13

Regarding the range of temperature values, i.e., "about 170-195°F" as used in claims 17 and 27, applicant does not believe that there is any lack of clarity. However, applicant has now amended such claims to remove the term "about."

For the above reasons, applicant asks that the rejections under 35 USC 112, second paragraph be lifted.

Claims 1-2, 4, 7, 10-12 and 18-22 were rejected under 35 USC 103(a) as unpatentable over Stoyell et al. in view of Marshall et al. Applicant respectfully disagrees, for reasons detailed below. Nevertheless, applicant has now amended claim 1, the sole independent claim of this group, and submits that amended claim 1 and its dependent claims are patentably distinguishable over this prior art.

The newly-cited patent deals with, among other things, the way in which pleats of the Stoyell et al. annular pleated filter cartridge lie against adjoining pleats, and the Stoyell et al. invention is said to be useful in a "wide variety of applications" (column 21, line 13). However, a review of the details of the disclosure show that the differing filter media referred to in the patent are like the prior art that has been cited and heretofore distinguished during prosecution of the present patent application.

More specifically, the "PTFE membrane" of the Stoyell et al. "element G" (column 20, line 31), which is referred to in paragraph 6 of the Office Action, is just that -- a *membrane* rather than a non-woven as required by all of applicant's claims, including claim 1. This is the sort of non-relevant filter medium that is referred to in the Ashelin et al. patent, which was the primary basis for the initial rejection -- a rejection overcome by the amendment and response filed on or

Patent Application Serial No. 09/599,269
Rose

Page 7 of 13

about November 28, 2001, and supported by the Declaration of Ernest Mayer. Dr. Mayer, in his declaration, in paragraphs 9 and 10 thereof and elsewhere, shows that membrane filters, like fluorocarbon membrane filters of Ashelin et al., are different in kind than the non-wovens in the annular pleated filter cartridges of the present invention.

Applicant wishes to point out that not only is the element G filter medium of the Stoyell et al. patent *not* a non-woven material, but the Examiner's statement in paragraph 6 of the Office Action is inaccurate in stating that the PTFE membrane of element G is "made of polyethylene." The PTFE membrane, like that of the Ashelin et al. patent, is a fluorocarbon material, rather than polyethylenec.

Unlike the element G filter medium, the element C filter medium of the Stoyell et al. patent (column 19, line 33) *is* a non-woven -- a non-woven polypropylene material which is much, much thicker than the specific non-woven used in the present invention. Indeed, the element C non-woven is some *14 times as thick* as the 0.15 mm specified as the thickest material falling within the range specified in applicant's amended claim 1.

Thus, the Stoyell et al. patent is fully consistent with the prior art as presented and discussed during prosecution of the instant patent application. Note, for example, Dr. Mayer's declaration (particularly at paragraphs 12 and 13) which refers to non-woven materials in prior annular pleated filter cartridges as "substantially thicker" than the TYVEK non-woven filter media of the claimed annular pleated filter cartridge -- while also describing why the use of the TYVEK non-woven filter media in an annular pleated filter cartridge would not have been obvious to the person of ordinary skill in the art. Thus, applicant has already laid out in

Patent Application Serial No. 09/599,269
Rose

Page 8 of 13

convincing detail how applicant's claimed invention is patentably distinct over the prior art, and specifically how it is unobvious to use the admitted TYVEK material in the claimed annular pleated filter cartridge. Claim 1 and its dependent claims, as well as claim 23 and its dependent claims, are patentably distinct over the prior art.

In a brief phone conversation with the Examiner on February 5, 2003, prior to submission of this amendment and response, the Examiner suggested that applicant should point out clearly what "non-woven" is understood to mean, either by reference to the application itself or by some reference showing the understanding in the art. Applicant is pleased to do so and will quote specifically from ASTM definitions -- to show the clear difference between a "non-woven" and a "membrane."

More specifically, the ASTM definition (D123, D-13) of a non-woven is "a textile structure produced by bonding or interlocking of *fibers*, or both, accomplished by mechanical, chemical, thermal, or solvent means and combinations thereof." And ASTM definition (D1129, D-19) of a membrane describes it as "a thin, *nonfibrous* filtration medium for fluids." That is, non-wovens are "fibrous" and membranes are "nonfibrous" -- or film-like. This understanding is well-known in the art.

For all these reasons, it is clear that all of applicant's claims, particularly claim 1 and its dependent claims as referred to above, are patentably distinct over the prior art, including the Stoyell et al. patent in view of Marshall et al.

Claim 3 was rejected under 35 USC 103(a) as unpatentable over Stoyell et al. in view of Marshall et al. and the DuPont TYVEK literature. This rejection is respectfully traversed in view

Patent Application Serial No. 09/599,269
Rose

Page 9 of 13

of the foregoing amendment and arguments. Claim 3, like its parent claims 1 and 2, is patentable over the prior art.

Claims 5-6, 8-9, 13, 23 and 28-31 were rejected under 35 USC 103(a) as unpatentable over Stoyell et al. in view of Marshall et al. and further in view of Miyagi et al. and certain portions of the *Encyclopedia of Polymer Science and Technology*, titled "Ethylene Polymers, LDPE." This rejection is respectfully traversed in view of the foregoing amendment and arguments. These claims, like claim 1 and the other claims discussed above, are patentable over the prior art.

The Miyagi et al. patent is a secondary reference. However, applicant notes that, as stated in the Miyagi et al. patent abstract, the Miyagi et al. filter medium is "a filter membrane made of fluorocarbon resin." Thus, the earlier-made and above-referenced arguments for patentability are equally applicable in this situation. The thinness of such membranes is *not* pertinent to the claimed annular pleated filter cartridge, with its non-woven material, a material having particular characteristics making it unobvious for an annular pleated filter cartridge as previously has been established with strong supporting evidence, including the aforesaid declaration of Dr. Mayer.

Finally, claims 14-15, 17, 24-25 and 27 were rejected under 35 USC 103(a) as unpatentable over Stoyell et al., Marshall et al., Miyagi et al. and "Ethylene Polymers, LDPE," the above-noted portions of the *Encyclopedia of Polymer Science and Technology*, and further in view of "Ethylene Polymers, HDPE," i.e., certain other portions of the *Encyclopedia of Polymer Science and Technology*, and Miller et al. (a total of six references combined). This rejection is

Patent Application Serial No. 09/599,269
Rose

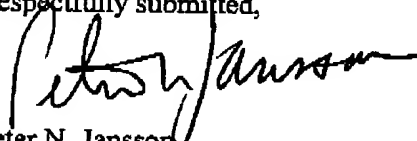
Page 10 of 13

respectfully traversed in view of the foregoing amendment and arguments. These claims, like claim 1 and the other claims discussed above, are patentable over the prior art.

Applicant has clearly established the patentability of the invention as set forth in the amended claims. By claim distinctions, arguments and evidence, including the compelling declaration of Dupont's Dr. Ernest Mayer, applicant has established that the invention as now claimed satisfies all conditions of patentability, including in particular as set forth in 35 USC §103.

As earlier noted, applicant's invention provides significant and important advantages over prior annular pleated filter cartridges having non-woven filter media. The claimed invention is both non-obvious and a particularly useful advance in the art. Favorable review and action are requested. The Examiner is invited to call the undersigned if such would be helpful in resolving any issue which might remain.

Respectfully submitted,

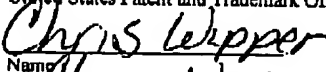

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CERTIFICATE OF FACSIMILE TRANSMISSION

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Patent Application Serial No. 09/599,269
Rose

Page 11 of 13

**VERSION WITH MARKINGS
TO SHOW CHANGES MADE**

Various claims have been rewritten as follows:

--1. (twice amended) A pleated filter cartridge for removing particulates from liquid, the pleated filter cartridge being of the type including a perforate core, a pair of endcaps, and an annular non-woven filter element around the core formed by substantially axially-parallel pleats of at least one sheet of filter material, the filter element having opposite ends each in sealing engagement with one of the endcaps, characterized in that the filter material is a non-perforated non-woven material of flash-spun plexifilamentary high-density polyethylene fibrils, the filter material having a thickness of less than about 0.15 mm, a pressure drop of less than 4 psid at a flow rate of 10 gal/hr, and a filtration efficiency of at least 98% of 1-2 micron particulates at a pressure differential of 30 psid.--

--6. (amended) The pleated filter cartridge of claim 1 [5] wherein the filter material has a thickness less than or equal to about 0.13 mm.--

--9. (amended) The pleated filter cartridge of claim 2 [8] wherein the filter material has a thickness less than or equal to about 0.13 mm.

Patent Application Serial No. 09/599,269
Rose

Page 12 of 13

--17. (amended) The pleated filter cartridge of claim 14 wherein the softening temperature range of the polyethylene mesh is within the range of [about] 170-195° F.--

--23. (amended) An annular pleated filter element for removing particulates from liquid formed by substantially parallel pleats of at least one sheet of filter material and a mesh layer of a low-density polyethylene, wherein the filter material is a non-perforated non-woven material of flash-spun plexifilamentary high-density polyethylene fibrils, the filter material having a thickness of less than about 0.15 mm, a pressure drop of less than 4 psid at a flow rate of 10 gal/hr, and a filtration efficiency of at least 98% of 1-2 micron particulates at a pressure differential of 30 psid.--

--27. (amended) The annular pleated filter element of claim 24 wherein the softening temperature range of the polyethylene mesh is within the range of [about] 170-195° F.--

--29. (amended) The pleated filter cartridge of claim 23 [28] wherein the filter material has a thickness less than or equal to about 0.13 mm.--

--30. (amended) The pleated filter cartridge of claim 1 wherein the at least one sheet of filter material is a single sheet of the filter material[and such sheet has a thickness of less than about 0.15 mm], whereby the total thickness of the filter material is less than about 0.15 mm.--

Patent Application Serial No. 09/599,269
Rose

Page 13 of 13

-31. (amended) The pleated filter cartridge of claim 23 wherein the at least one sheet of filter material is a single sheet of the filter material[and such sheet has a thickness of less than about 0.15 mm], whereby the total thickness of the filter material is less than about 0.15 mm.--